

CLAIMS

1. A scroll compressor provided with a housing, a shaft having a crank part rotatably axially supported by said housing and partially offset, and a movable scroll having a spiral shaped blade and end plate and driven to orbit by the crank part of said shaft, and a fixed scroll having a spiral shaped blade meshing with the movable scroll and end plate and fixed to said housing, where when said movable scroll is driven to orbit by the crank part of said shaft, while a plurality of working chambers formed between the blade of said movable scroll and the blade of said fixed scroll move toward the center, the volumes of the working chambers are successively reduced and thereby the fluid is compressed in the working chambers,

said scroll compressor further provided with:

a middle housing provided as part of said housing behind said movable scroll for supporting a thrust load in an axial direction of said shaft acting on said movable scroll along with the rise in the compression pressure of the fluid in the working chambers;

at least one ring-shaped groove forming a backpressure chamber in one of a back surface of the end plate of said movable scroll and a front surface of said middle housing facing and supporting the same;

a passage for introducing high-pressure fluid into said ring-shaped groove; and

at least one ring-shaped seal ring fit movably in said ring-shaped groove.

2. A scroll compressor as set forth in claim 1, wherein said at least one ring-shaped seal ring is fit to be able to slightly incline in sectional shape in said ring-shaped groove.

3. A scroll compressor as set forth in claim 2, wherein an

elastic member for biasing said seal ring toward an outer circumference or inner circumference of said ring-shaped groove is arranged behind said seal ring.

4. A scroll compressor as set forth in claim 2, wherein said at least one seal ring includes a first seal ring fit along an outer circumference of said ring-shaped groove and a second seal ring fit along an inner circumference of said ring-shaped groove, each fabricated from a material such as rubber, plastic, or metal having wear resistance, oil resistance, and elasticity; said first seal ring forms a ring-shaped projection having an outer diameter larger than an outer circumference diameter of said ring-shaped groove in a no-load state before being fit in said backpressure chamber at a portion facing a portion close to the bottom surface of said ring-shaped groove in the outer circumference of said groove; and said second seal ring forms a ring-shaped projection having an inner diameter smaller than an inner circumference diameter of said ring-shaped groove in said no-load state at a portion facing a portion close to the bottom surface of said ring-shaped groove in the inner circumference of said groove.

5. A scroll compressor as set forth in claim 4, wherein part of at least one of the outer circumference of said first seal ring and inner circumference of said seal ring is formed with a tapered surface, whereby part of said ring-shaped projection forms an edge-shaped projecting rim.

6. A scroll compressor as set forth in claim 2, wherein said at least one seal ring includes a first seal ring fit along an outer circumference of said ring-shaped groove and having a rectangular sectional shape and a second seal ring fit along an inner circumference of said ring-shaped groove and having a

rectangular sectional shape, each fabricated from a material such as rubber, plastic, or metal having wear resistance, oil resistance, and elasticity; said first seal ring has an outer diameter set larger than an outer circumference diameter of said ring-shaped groove in a no-load state before being fit in said backpressure chamber at a portion facing a portion close to the bottom surface of said ring-shaped groove; and said second seal ring has an inner diameter set smaller than an inner circumference diameter of said ring-shaped groove in said no-load state at a portion facing the inner circumference of said ring-shaped groove.

7. A scroll compressor as set forth in claim 4, further provided with an elastic member arranged between said first seal ring and said second seal ring for biasing said first seal ring toward an outer circumference of said ring-shaped groove and biasing said second seal ring toward an inner circumference of said ring-shaped groove.

8. A scroll compressor as set forth in claim 6, further provided with an elastic member arranged between said first seal ring and said second seal ring for biasing said first seal ring toward an outer circumference of said ring-shaped groove and biasing said second seal ring toward an inner circumference of said ring-shaped groove.

9. A scroll compressor as set forth in claim 2, wherein said at least one seal ring is comprised of a first seal ring part fit along an outer circumference of said ring-shaped groove, a second seal ring part fit along an inner circumference of said ring-shaped groove, and a connecting part integrally connecting said first seal ring part and said second seal ring part, each part fabricated from a material such as rubber, plastic, or metal having wear resistance,

oil resistance, and elasticity; said first seal ring part forms a ring-shaped projection having an outer diameter larger than an outer circumference diameter of said ring-shaped groove in a no-load state before being fit in said backpressure chamber at a portion facing a portion close to the bottom surface of said ring-shaped groove in the outer circumference of said groove; and said second seal ring part forms a ring-shaped projection having an inner diameter smaller than an inner circumference diameter of said ring-shaped groove in said no-load state at a portion facing a portion close to the bottom surface of said ring-shaped groove in the inner circumference of said groove.

10. A scroll compressor as set forth in claim 2, wherein said at least one seal ring is comprised of a first seal ring part fit along an outer circumference of said ring-shaped groove and having a rectangular sectional shape, a second seal ring part fit along an inner circumference of said ring-shaped groove and having a rectangular sectional shape, and a connecting part integrally connecting said first seal ring part and said second seal ring part, each part fabricated from a material such as rubber, plastic, or metal having wear resistance, oil resistance, and elasticity; said first seal ring part has an outer diameter set larger than an outer circumference diameter of said ring-shaped groove in a no-load state before being fit in said backpressure chamber at a portion facing a portion close to the bottom surface of said ring-shaped groove; and said second seal ring part has an inner diameter set smaller than an inner circumference diameter of said ring-shaped groove in said no-load state at a portion facing the inner circumference of said ring-shaped groove.

11. A scroll compressor as set forth in claim 9, wherein at least part of said connecting part is configured to directly

contact the opposing surface as one seal ring part.

12. A scroll compressor as set forth in claim 10, wherein at least part of said connecting part is configured to directly contact the opposing surface as one seal ring part.

13. A scroll compressor as set forth in claim 9, further provided with an elastic member arranged between said first seal ring part and said second seal ring part for biasing said first seal ring part toward an outer circumference of said ring-shaped groove and biasing said second seal ring part toward an inner circumference of said ring-shaped groove.

14. A scroll compressor as set forth in claim 10, further provided with an elastic member arranged between said first seal ring part and said second seal ring part for biasing said first seal ring part toward an outer circumference of said ring-shaped groove and biasing said second seal ring part toward an inner circumference of said ring-shaped groove.

15. A scroll compressor as set forth in claim 1, further provided with an elastic ring-shaped seal member fit so as to seal the clearance between a side surface of said at least one seal ring and a side surface of said ring-shaped groove.

16. A scroll compressor as set forth in claim 15, wherein said elastic ring-shaped seal member is a rubber O-ring.

17. A scroll compressor as set forth in claim 15, wherein said ring-shaped seal ring is mainly comprised of a material selected from carbon, metal, plastic, and ceramic having a superior self-lubricating action and high hardness.

18. A scroll compressor as set forth in claim 15, wherein said elastic ring-shaped seal member is supported at a predetermined position by a ring-shaped support formed in at least one of said seal ring and a surface of said backpressure chamber facing the same.

19. A scroll compressor as set forth in claim 1, wherein said at least one ring-shaped seal ring is formed at its end with a flange increasing the sliding area.

20. A scroll compressor as set forth in claim 15, wherein said at least one seal ring is comprised of a first seal ring part fit along an outer circumference of said ring-shaped groove forming said backpressure chamber, a second seal ring part fit along an inner circumference of said ring-shaped groove, and a connecting part integrally connecting said first seal ring part and said second seal ring part.

21. A scroll compressor as set forth in claim 9, wherein said connecting part is formed with at least one communicating hole.

22. A scroll compressor as set forth in claim 20, wherein said connecting part is formed with at least one communicating hole.

23. A scroll compressor as set forth in claim 1, wherein said shaft is driven to rotate by a motor directly attached to said housing.

24. A scroll compressor as set forth in claim 1, wherein said shaft is driven to rotate by an external prime mover such as an internal combustion engine mounted in a vehicle.

25. A scroll compressor as set forth in claim 1, wherein said fluid to be compressed is a refrigerant flowing through a refrigeration cycle and a said refrigerant is compressed to at least a critical pressure of said refrigerant.